13 September 1963

MEMORANDUM FOR THE RECORD

SUBJECT: Staff Study - A Review of the Step-and-Repeat Contact Printer Contract

REFERENCE: (a) P&DS Staff Study re Step-and-Repeat Printer dated 15 April 1963

(b) P&DS Report on Pre-Shipment Inspection of Precision 3X-6X-12X Enlarger, dated 29 August 1963

25X1A

1. PROBLEM: To determine whether the present [redacted] with [redacted] 25X1A
25X1A [redacted] for the development of a Step-and-Repeat Contact Printer, adequately comprehends the ultimate purposes for such a development, and consequently, whether the contract should be continued.

2. FACTS:

a. The requirements for the development of the subject printer have been reviewed and verified to be as follows:

(1) An ultra-high resolution (more than 300 lines/mm high contrast) highly-automated, roll film contact printer is urgently needed.

(2) The capability of printing individual isolated exposures within a roll is needed.

(3) The capability of printing multiple copies of various, individual isolated exposures within a roll is needed.

(4) Accommodation of film widths from 70mm to 9½", single frame lengths up to 50" and roll lengths up to 1000 ft. is needed.

(5) Accommodation for both color and black-and-white printing is needed.

(6) Automatic exposure control and dodging is desired.

(7) Arbitrary superimposition of a reseau is required by GIMRADA.

(8) Immediate application is required. All these requirements have been independently satisfied on various existing printers. The

present objective is to regroup these parameters in a single instrument. No requirements for advances in the state-of-the-art have been levied. It is therefore anticipated that the prototype will be a serviceable device.

b. The design objectives for this printer were originally conveyed in verbal form to four potential developers; namely, [redacted] 25X1A
25X1A [redacted] Accordingly proposals were submitted by all except
25X1A [redacted] with the following price quotations:

25X1A	(1) [redacted]	CPFF
	(2)	CPFF
	(3)	CPFF

* Note: At the TDC meeting the [redacted] proposal was promulgated as "Fixed Price" rather than CPFF by reference (a), however, it was later determined by [redacted] to be CPFF as is indicated above. The proposal was confusing on this point but it is not felt that the bidder can be held accountable for this misunderstanding. 25X1A
25X1A

c. GIMRADA does not desire to contract their Step-and-Repeat Printer
25X1A with [redacted] They do not wish to cause this Center embarrassment, but have expressed the desire to withdraw from the joint procurement agreement
5X1 with [redacted] if this is feasible. However, GIMRADA is still very interested in this development and desires to utilize the rapid administrative processing facilities of the Center, to the extent that they would go along with the
5X1 [redacted] contract if no other course is open to them.

d. The pre-delivery inspection of the 3X-12X Precision Enlarger developed
25X1A for NPIC by [redacted] as reported by reference (b) indicates that significant discrepancies exist between the desired and the finished product. Since it was difficult to ascertain whether these discrepancies were caused by poor communications from the design objectives and the contract monitoring standpoints or by negligence on the part of the contractor, a number of previous developments contracted to [redacted] were investigated. A resume of the results of these investigations follows: 25X1A

(1) 70mm Coding Copy Camera and Code Searching Reader Viewer. This development involved the modification of the standard [redacted] 70mm "Planetary" Copy Camera to include a means for adding an identifying code block to the side of the copy picture; and the development of a 70mm Viewer-Printer which is instructed by IBM cards to locate a given code and present the corresponding picture on the viewer; at which time a Q&D copy print of
25X1 the [redacted] variety can be made if desired.

(a) Agency: USNPIC
(b) Approx. date: July 61 - Jan. 63
25X1A (c) Cost: [redacted]

Evaluation: This development was intended to produce a system for testing the feasibility of a concept; consequently, the proposal which appeared to adequately cover the basic requirements at the lowest cost was selected. It was anticipated that refinement would be lacking and that considerable technical direction would be required. This proved to be the case, however, after several pre-delivery inspections and several debugging visits by the contractor, an operating system was achieved.

(2) Electrostatic Plate Coating Machine. This machine was developed for the purpose of applying a zinc-oxide resin-based coating to aluminum plates in order to render them capable of holding a photosensitive static charge. It also included a device for developing the static electric image into an ink receptive matrix for subsequent multilith reproduction.

(a) Agency: GIMRADA
(b) Approx. date: 1959
(c) Cost: $ [redacted]

25X1A

Evaluation: This was obviously a simple development, however, it did involve some unknowns. The mechanical engineering was felt to be poor. [redacted] corrected all the major deficiencies in the equipment without additional cost to the Government. The overall evaluation of the contract was "good."

5X1

(3) 4X Continuous Printing Enlarger. This development consisted of a fixed 4X optical enlarger fitted with scanning systems to synchronize the input 70mm film and the output 9" film, so that a roll of 70mm film could be continuously enlarged to a roll of 9" film.

(a) Agency: NPIC for AMS
(b) Approx. date: June 1962
(c) Cost: [redacted]

25X1A

Evaluation: This contract was handled by NPIC for AMS. AMS representatives feel that the device is not a good solution to the problem in that its performance lacks the necessary precision for a satisfactory reproduction. This is manifested in a differential scale in the direction of scan compared to that of the optical system. The variations in scan velocity which cause this are not significant enough to degrade the image resolution below the specified 20 lines/mm, however, it alters the photo geometry so that mensuration is impaired. AMS reps were careful to point out that this deficiency could have resulted from inadequate statements of the requirements rather than negligence on the part of the contractor. The general evaluation of the instrument was "Fair."

e. 3X-12X Precision Enlarger. The purpose of this instrument is to fill the gap between the [redacted] VG-1 and the [redacted] 10-20-40 enlargers. The performance of these two instruments best defines the type of performance required for this development. Existing enlargers such as the [redacted] do not have the basic performance nor structural rigidity to be modified into a suitable instrument. There may be other makes such as the Saltzman which are subject to modification, however, each would have to be thoroughly analyzed and some compromises would be certain. The most significant requirements for the instrument are:

(1) Performance in resolution and illumination equal to or better than the VG-1. The general figure of 180 lines/mm was stated in the [redacted] proposal.

(2) 70mm - 9" x 250 ft. roll film handling capability including ability to center the image and motorized film transport.

(3) The enlarger should be auto-focus and at least as easy as the VG-1 to operate.

The corresponding administrative data is as follows:

(a) Agency: NPIC
(b) Date: delivery imminent
(c) Cost: Original verbal proposal
Written proposal
Contract
Contract and Overrun [redacted]

Evaluation: This contract has had two monitors, [redacted] through most of the development and [redacted] in the pre-delivery inspection. On examination of the records it was ascertained that the statement of the requirements for this device were quite brief, considering the performance desired; however, it is felt that [redacted] was aware of the fact that the performance was to be comparable with the [redacted] VG-1 and [redacted] 10-20-40 enlargers. The explicit evaluation of the device by [redacted] may be found in reference (b). The major discrepancies appear to be:

(1) Inadequate support of the enlarger head and film spools.

(2) Inadequate structual rigidity in the device as a whole.

(3) Poor design of the easel both in the vacuum hold-down and the means for achieving and maintaining flatness.

(4) A general lack of the precision that is expected for a high performance instrument.

f. The idea of the Step-and-Repeat printer has been under consideration for some time. There is some question as to whether or not this is a valid line of development. For this reason [ ] has been instructed to conduct a study for the purpose of defining parameters relevant to the requirements for contact duplication and the performance limits of the existing techniques. 25X1A

3. CONCLUSIONS:

a. There is evidence that part of the difficulty in the Center's contractual relationships with [ ] is due to the lack of clearly defined, comprehensive, written design objectives. Small corporations with correspoidingly small engineering staffs generally need more specific guidance. 25X1A

b. It is probable that there is also a breakdown in communications during the monitoring phase. It appears that some of the deficiencies noted on the 3X - 12X enlarger might have been discovered and corrected at the design stage.

c. The general character of the projects investigated does not indicate that [ ] has had experience in developing or producing equipment of the same precision as that of the [ ] enlargers. 25X1A 25X1A

d. The cost of the developments investigated generally matches the qualtiy of the product. It appears that the Government invariably got what it paid for.

e. Continuation of the Step-and-Repeat Printer contract with [ ] under the present circumstances would be unwise. The lack of specific design objectives, the possibility that the precision and complexity required is beyond the [ ] capability and the questionable benefits of the concept all tend to jeopardize the successful completion of the contract. 25X1A 25X1A

4. RECOMMENDATIONS:

a. That, whenever possible, formal written design objectives be prepared. In some cases this is not practical, but in those instances where the contractor's performance is unknown or has demonstrated the need, this document is indespensible.

b. Contract monitors be reminded of the necessity for frequent, comprehensive contact with the contractor, the requirements and the ultimate user.

c. Potential contractors be carefully evaluated with respect to the levels of invention, precision and complexity required and those which have been previously demonstrated by the contractor.

d. Cost of a development be weighed against the level of quality attainable under the economic restraints imposed. CPFF contracts should generally be limited to developments requiring advances in the state-of-the-art.

e. Step-and-Repeat Printer contract with [redacted] be terminated on the basis of "the best interest of the Government," pending further discussions with [redacted] a re-evaluation of the concept and possibly the results of the [redacted] study. After this has been done, if the requirement is still determined to exist, then design objectives should be prepared and a representative group of qualified contractors should be invited to propose.

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[redacted]